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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,339	02/21/2001	Sadaji Tsuge	TOR.011.0001.NP	1063
58789 7590 01/15/2008 NDQ&M WATCHSTONE LLP 1300 EYE STREET, NW SUITE 1000 WEST TOWER WASHINGTON, DC 20005			EXAMINER BARTON, JEFFREY THOMAS	
			ART UNIT 1795	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/788,339	Applicant(s) TSUGE, SADAJI	
	Examiner Jeffrey T. Barton	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16,18-20 and 22-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16,18-20 and 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 14 November 2007 does not place the application in condition for allowance.

Status of Rejections Pending Since the Office Action of 14 June 2007

2. All rejections of claim 17, 21, and 25-27 are obviated by cancellation of the claims.
3. All other rejections are withdrawn due to Applicant's amendment.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 16, 18-20, and 22-24 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. At line 16 of claim 16, "the one conductive type semiconductor layer" is recited, although there is no clear antecedent basis for this term. The same grounds apply to claims 18-20 and 22-24. The claims are treated as though the anti-reflective layer were required to be between the one conductive type crystalline semiconductor substrate and the resin containing the sodium ion.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 16, 18-20, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-307791 (herein referred to as JP '791) in view of Yamagishi et

al (U.S. Patent 6,300,556), Brandhorst, Jr (U.S. Patent 4,131,486), Spitzer (U.S. Patent 4,667,060), Mitsui et al (U.S. Patent 4,649,088) and the instant disclosure.

Regarding claim 16, JP '791 discloses a solar cell module (Figures 1 and 2) comprising a solar cell element (1); a light incidence side light transmitting member made of glass (3) adhered at a light incidence side of the solar cell element by a resin (EVA 2 lying between the cells 1 and glass 3; Paragraph 0023); a rear surface member comprising a resin film (PET film 4) adhered at a rear surface side of the solar cell element by a resin (EVA 2 lying between cells 1 and PET film 4; Paragraph 0023); wherein the solar cell element (Figure 2) comprises a semiconductor junction so as to form an electric field (Across pin junction formed by layers 11-13) and is sealed with the EVA resin layer 2 (Paragraphs 0023 and 0024).

Both the front surface side light transmitting member 3 and the rear surface member 4 transmit incident light (see Figures 1, 5, and 6). The sealing resin 2 is interposed between the front surface light transmitting member 3 and the solar cells 1 and is also interposed between the rear surface member 4 and the solar cells 1 (see Figure 1). With respect to the solar cell in JP '791's Figure 2, note in JP '791's paragraph 0024 that it is taught that on one principal plane of the n-type crystalline silicon substrate 11, there is laminated an i-type a-Si layer 12 and p-type a-Si layer 13. It is also taught that on the principal plane on another side of the n-type crystalline silicon substrate 11 there is laminated i-type a-Si layer 16 and n-type a-Si layer 17 (see paragraph 0024). The solar cell 1 has two transparent electrodes 14 and 18 at the top and bottom surfaces (see Figure 2; and paragraph 0024). These electrodes allow light

to enter from both the front and rear surfaces of the solar cell module (see Figures 1, 5, and 6). The rear surface member is formed of a transparent resin film (PET) (see Figure 1; and paragraph (0025)).

JP '791 does not explicitly teach that the resin adhering the light incidence side light transmitting member at the light incidence side of the solar cell element contains sodium ion, nor does the reference explicitly disclose that a one conductive type crystalline semiconductor substrate is disposed between the semiconductor junction and the resin containing the sodium ion.

Yamagishi et al discloses the use of soda lime glass, which contains sodium, as a front surface member (Column 7, line 29). Soda lime glass is a conventional glass used in solar cell modules because it is inexpensive.

The instant disclosure teaches that sodium ions from the front glass in solar modules of this type diffuse from the glass into the resin that adheres the glass to the solar cells. After conventional testing, the amount of sodium disclosed as present in the resin is 0.3 $\mu\text{g/g}$. (Specification Page 5, line 19 - Page 7, line 2)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module of JP '791 to use soda lime glass as the front surface member, as taught by Yamagishi et al, because soda lime glass is very inexpensive and provides excellent weather resistance. The selection of a

known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

In such a combination, the presence of sodium ions in the resin lying between the cells and the glass member must be considered inherent, inasmuch as the instant disclosure teaches that sodium ions diffuse from a glass layer into the sealing resin under conventional conditions (Specification Page 5, line 19 - Page 7, line 2) Specific to claim 17, the specification teaches that this level of sodium ions in the resin results from standard test conditions, which would clearly obviously result in the combination taught above.

Regarding the position of the n-type crystalline substrate 11 with respect to the thin film amorphous layers 12, 13 and the light incidence side light transmitting member, the solar cell module of JP '791 allows light to enter from both sides (Figures 1, 5, and 6), but the front surface side light transmitting member 3 is at the principal light incidence side (see paragraphs 0023 and 0026-0028). Therefore, light coming in from either direction contributes to the generation of electricity. Furthermore, with respect to the solar cell in JP '791's Figure 2, note in JP '791's paragraph 0024 that it is taught that on one principal plane of the crystalline silicon substrate 11, there is laminated an i-type a-Si layer 12 and p-type a-Si layer 13. It is also taught that on the principal plane on another side of the crystalline silicon substrate 11 there is laminated i-type a-Si layer 16 and n-type a-Si layer 17 (see paragraph 0024). JP '791 does not require said one principal plane on which the i-type a-Si layer 12 and p-type a-Si layer 13 to be the front

face. JP '791 exemplifies the front face and recites "front face" in parenthesis for layers 12 and 13, and exemplifies the rear face and recites "rear face" in parenthesis for layers 16 and 17 (see paragraph 0024; and Figure 2). However, JP '791 does not require layers 12 and 13 to be at the front surface and layers 16 and 17 to be at the rear face. Thus, a skilled artisan readily recognizes that the solar cell seen in Figure 2 of JP '791 can be placed in JP '791's module in Figure 1 with layers 12 and 13 at the front face (i.e., layers 12 and 13 closer to light transmitting member 3) or at the rear face (i.e., layers 12 and 13 closer to rear surface member 4). Such is the case because the solar cell in said Figure 2 can receive light from both sides (see Figure 1; and the first sentence of paragraph 0024). Furthermore, the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst, Jr (Figures 2 and 4; and col. 1, line 60 through col. 2, line 25) and Spitzer (see Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared JP '701's solar cell module such that the solar cell in JP '791's Figure 2 is present in the module with the p-i-n junction between layers 11, 12 and 13 at the rear face of the solar cell, and thus, the n-type crystalline silicon substrate 11 is between the resin adjacent principal light transmitting member 3 and the junction formed between p-type a-Si layer 13 and n-type substrate 11 because light can enter from both sides of JP '791's solar cell and thus, the p-i-n junction can be closer to either the light transmitting member 3 or the rear surface member 4; JP '791 is not limited to layers 12 and 13 to be at the front surface; and the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst,

Jr and Spitzer. In other words, to take the solar cell in JP '791's Figure 2, flip it over it over, and then insert it into JP '791's Figure 1, would have been within the level of ordinary skill in the art because light can enter from both sides of JP '791's solar cell in Figure 2, and thus, the p-i-n junction can be closer to either the light transmitting member 3 or the rear surface member 4; JP '791 is not limited to layers 12 and 13 to be at the front surface; and the presence of a photovoltaic junction at the rear face of a solar cell is well known in the art as shown by Brandhorst, Jr and Spitzer.

Regarding the anti-reflection layer limitations, JP '791 does not explicitly disclose an anti-reflection layer comprising silicon oxide positioned between the one conductive type semiconductor and the sodium ion-containing resin.

Mitsui et al teaches an antireflection coating for light-receiving surfaces of photoelectric devices (Abstract, summary sections), comprising a silicon dioxide layer. (Figure 4, layers 8a and 8b; Column 4, lines 14-54; Silicon oxide of 1.45 refractive index is silicon dioxide)

It would also have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of JP '791 by providing the anti-reflective coating of Mitsui on the light receiving surfaces of the solar cell, as taught by Mitsui, because Mitsui teaches that providing this layer on a silicon solar cell surface reduces reflection significantly relative to a solar cell without the coating. (Column 4, lines 46-50; Column 3, lines 47-53 for comparison) A skilled artisan would have recognized the

advantage of this coating in increasing the amount of radiation absorbed by the cells, and thus increasing the overall efficiency of the system.

Regarding claim 18, JP '791 teaches that n-type substrate 11 consists of single crystalline silicon. (Paragraph 0024) As there is no teaching of a thickness required to shield diffusion of sodium ion in the instant specification, the thickness of this substrate is considered to inherently provide some shielding of the diffusion of sodium ion as claimed.

Regarding claim 19, in the combination described above, n-type a-Si layer 17 will be disposed between the n-type c-Si substrate 11 and the resin containing sodium ion.

Regarding claim 20, in the combination described above, transparent ITO electrode 18 will be disposed between the n-type a-Si layer 17 and the resin containing sodium ion.

Regarding claim 23, in the combination described above, the semiconductor junction is formed between the n-type crystalline substrate 11 and the p-type amorphous layer 13.

Regarding claim 24, in the combination described above, i-type a-Si layer 12 is disposed between p-type a-Si layer 13 and n-type c-Si substrate 11.

In this rejection undue weight cannot be given to the limitation "to shield a diffusion of sodium ion to the semiconductor junction", because this is a recitation of intended function or use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure

is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). In this case, no structure that is distinct from that taught by the prior art is required by the limitation.

10. Claims 16, 18-20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brandhorst, Jr. in view of Mimura et al, Mitsui et al, and the instant disclosure.

Regarding claim 16, Brandhorst, Jr. discloses a solar cell element comprising a semiconductor junction so as to form an electric field (i.e. junction 11 between p-type substrate 10 and n+ type layer 12; Figure 1) The cell is designed such that incident light is to impinge upon the cell on the side of substrate 10 opposite junction 11.

Regarding claim 18, Brandhorst, Jr. discloses that p-type substrate 10 comprises single crystal silicon. (Column 2, lines 7-9)

Regarding claim 19, Brandhorst, Jr. teaches a p+ layer 16 disposed on the light-incident side substrate 10.

Regarding claim 20, electrode layer 18 of Brandhorst, Jr. allows light to pass into the cell (Column 3, lines 8-14), and therefore reads on a "transparent electrode".

Regarding claim 22, Brandhorst, Jr. discloses that n+ layer 12 is formed by diffusion of n-type dopants into crystalline substrate 10. (Column 2, lines 60-66) The layer is therefore crystalline as claimed.

Regarding claim 25, Brandhorst, Jr. discloses that p+ layer 16 is formed by diffusion of p-type dopants into crystalline substrate 10. (Column 3, lines 3-8) The layer is therefore crystalline as claimed.

Brandhorst, Jr. does not explicitly disclose the instant light incidence side light transmitting member, rear surface member, resin, or sodium ion present in the resin. Brandhorst, Jr. is silent concerning encapsulation of the cell.

Mimura et al teach an encapsulation system for solar cells (Figure 1), comprising a soda-lime glass light incident side light transmitting member (105; Column 7, lines 25-67) that is adhered to a light incidence side of the solar cell by a resin (Filler 103 disposed between the cells and glass; Figure 1; Column 6, lines 52-67); a rear surface member comprising a resin film (e.g. TEDLAR Backside covering member 102; Column 6, lines 29-51) that is adhered to the rear surface of the solar cell by a resin (Filler 103 disposed between the cells and member 102; Figure 1; Column 6, lines 52-67) The cells are sealed in filler 103 between plate 105 and member 102. (Figure 1)

The instant disclosure teaches that sodium ions from the front glass in solar modules of this type diffuse from the glass into the resin that adheres the glass to the solar cells. After conventional testing, the amount of sodium disclosed as present in the resin is 0.3 µg/g. (Specification Page 5, line 19 - Page 7, line 2)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Brandhorst, Jr. by specifically encapsulating the cells in the encapsulation system of Mimura et al, because Mimura suggests that any conventional cell is suitable for encapsulation in their system (Column 7, lines 1-6), and it is well recognized in the art that the useful lifetime of silicon solar cells is greatly lengthened by encapsulating them to protect them from corrosion caused by atmospheric oxygen and water vapor. In such a combination, obviously the light incident side of Brandhorst, Jr. (Top side in Figure 1) would be placed closest to the glass layer 105 of Mimura et al, since layer 105 faces incoming radiation. (Mimura et al Figure 1; Column 7, lines 25-32) Such positioning meets the limitations of claims 16, 18-20, 22, and 25.

In such a combination, the presence of sodium ions in the resin filler lying between the cells and the glass member must be considered inherent, inasmuch as the instant disclosure teaches that sodium ions diffuse from a glass layer into the sealing resin under conventional conditions (Specification Page 5, line 19 - Page 7, line 2) Specific to claim 17, the specification teaches that this level of sodium ions in the resin results from standard test conditions, which would clearly obviously result in the combination taught above.

Regarding the anti-reflection layer limitations, JP '791 does not explicitly disclose an anti-reflection layer comprising silicon oxide positioned between the one conductive type semiconductor and the sodium ion-containing resin.

Mitsui et al teaches an antireflection coating for light-receiving surfaces of photoelectric devices (Abstract, summary sections), comprising a silicon dioxide layer. (Figure 4, layers 8a and 8b; Column 4, lines 14-54; Silicon oxide of 1.45 refractive index is silicon dioxide)

It would also have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cell of Brandhorst, Jr. by providing the anti-reflective coating of Mitsui on the light receiving surface of the solar cell, as taught by Mitsui, because Mitsui teaches that providing this layer on a silicon solar cell surface reduces reflection significantly relative to a solar cell without the coating. (Column 4, lines 46-50; Column 3, lines 47-53 for comparison) A skilled artisan would have recognized the advantage of this coating in increasing the amount of radiation absorbed by the cells, and thus increasing the overall efficiency of the system.

Regarding claim 18, since there is no teaching of a thickness required to shield diffusion of sodium ion in the instant specification, the thickness of substrate 10 of Brandhorst, Jr. is considered to inherently provide some shielding of the diffusion of sodium ion as claimed.

11. Claims 16, 18-20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mimura et al in view of Brandhorst, Jr., Mitsui et al, and the instant disclosure.

Regarding claim 16, Mimura et al teach an encapsulation system for solar cells (Figure 1), comprising a soda-lime glass light incident side light transmitting member (105; Column 7, lines 25-67) that is adhered to a light incidence side of the solar cell by a resin (Filler 103 disposed between the cells and glass; Figure 1; Column 6, lines 52-67); a rear surface member comprising a resin film (e.g. TEDLAR Backside covering member 102; Column 6, lines 29-51) that is adhered to the rear surface of the solar cell by a resin (Filler 103 disposed between the cells and member 102; Figure 1; Column 6, lines 52-67) The cells are sealed in filler 103 between plate 105 and member 102. (Figure 1)

Mimura et al do not specifically teach a solar cell element comprising a one conductive type crystalline semiconductor substrate between the semiconductor junction and resin containing sodium ion.

Regarding claim 16, Brandhorst, Jr. discloses a solar cell element comprising a semiconductor junction so as to form an electric field (i.e. junction 11 between p-type substrate 10 and n+ type layer 12; Figure 1) The cell is designed such that incident light is to impinge upon the cell on the side of substrate 10 opposite junction 11.

Regarding claim 18, Brandhorst, Jr. discloses that p-type substrate 10 comprises single crystal silicon. (Column 2, lines 7-9)

Regarding claim 19, Brandhorst, Jr. teaches a p+ layer 16 disposed on the light-incident side substrate 10.

Regarding claim 20, electrode layer 18 of Brandhorst, Jr. allows light to pass into the cell (Column 3, lines 8-14), and therefore reads on a "transparent electrode".

Regarding claim 22, Brandhorst, Jr. discloses that n+ layer 12 is formed by diffusion of n-type dopants into crystalline substrate 10. (Column 2, lines 60-66) The layer is therefore crystalline as claimed.

The instant disclosure teaches that sodium ions from the front glass in solar modules of this type diffuse from the glass into the resin that adheres the glass to the solar cells. After conventional testing, the amount of sodium disclosed as present in the resin is 0.3 µg/g. (Specification Page 5, line 19 - Page 7, line 2)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Mimura et al by specifically installing the solar cells of Brandhorst, Jr., because Mimura suggests that any conventional cell is suitable for encapsulation in their system (Column 7, lines 1-6), and Brandhorst, Jr. teaches that his cells provide superior latitude in junction formation and low contact resistance, which would have been recognized as advantageous to one having ordinary skill in the art. In such a combination, obviously the light incident side of Brandhorst, Jr. (Top side in Figure 1) would be placed closest to the glass layer 105 of Mimura et al, since layer 105 faces incoming radiation. (Mimura et al Figure 1; Column 7, lines 25-32) Such positioning meets the limitations of claims 16, 18-20, 22, and 25.

In such a combination, the presence of sodium ions in the resin filler lying between the cells and the glass member must be considered inherent, inasmuch as the instant disclosure teaches that sodium ions diffuse from a glass layer into the sealing

resin under conventional conditions (Specification Page 5, line 19 - Page 7, line 2)

Specific to claim 17, the specification teaches that this level of sodium ions in the resin results from standard test conditions, which would clearly obviously result in the combination taught above.

Regarding the anti-reflection layer limitations, JP '791 does not explicitly disclose an anti-reflection layer comprising silicon oxide positioned between the one conductive type semiconductor and the sodium ion-containing resin.

Mitsui et al teaches an antireflection coating for light-receiving surfaces of photoelectric devices (Abstract; summary sections), comprising a silicon dioxide layer. (Figure 4, layers 8a and 8b; Column 4, lines 14-54; Silicon oxide of 1.45 refractive index is silicon dioxide)

It would also have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cell of Brandhorst, Jr. by providing the anti-reflective coating of Mitsui on the light receiving surface of the solar cell, as taught by Mitsui, because Mitsui teaches that providing this layer on a silicon solar cell surface reduces reflection significantly relative to a solar cell without the coating. (Column 4, lines 46-50; Column 3, lines 47-53 for comparison) A skilled artisan would have recognized the advantage of this coating in increasing the amount of radiation absorbed by the cells, and thus increasing the overall efficiency of the system.

Regarding claim 18, since there is no teaching of a thickness required to shield diffusion of sodium ion in the instant specification, the thickness of substrate 10 of Brandhorst, Jr. is considered to inherently provide some shielding of the diffusion of sodium ion as claimed.

Response to Arguments

12. Applicant's arguments filed 14 November 2007 have been fully considered but they are not persuasive.

Applicant's remarks include a description of advantages of the instant solar cell module over those of the prior art. The Examiner appreciates Applicant's position, but must emphasize that the differences between the instant modules and the disclosure of the prior art must be reflected in the claims. As explained in detail above, all structural limitations of the claims are considered obvious over the teachings of the prior art.

Applicant argues that JP '791 teaches a p-n junction 13-11 adjacent to the glass layer. The Examiner maintains the position that JP '791 is not so limited. JP '791 teaches cells that can utilize radiation incident on either cell face, and teaches that the module utilizes light incident on either side of the module. A skilled artisan would have therefore recognized that a functioning module would result with the p-i-n- junction 13-12-11 positioned either towards glass layer 3 or PET film 4, and it would have been obvious to use either orientation.

Applicant describes teachings within the Brandhorst, Jr, Yamagishi, and Mimura et al references, but it is not clear what arguments are being made. The Examiner

agrees that no single one of these references discloses the instant module by itself.

The rejections have thus been made under 35 U.S.C. §103(a).

The Examiner agrees that Whitehouse does not describe an antireflective layer comprising silicon dioxide as now claimed - Mitsui et al is now relied upon for this teaching.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
9 January 2007


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SUPERVISORY PATENT EXAMINER
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